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Tell me a Story: the use of narrative as a learning tool for natural selection

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ABSTRACT

Grounded within literature pointing to the value of narrative in communicating scientific information, the purpose of this study was to examine the use of stories as a tool for teaching about natural selection in the context of school science. The study utilizes a mixed method, case study approach which focuses on the design, implementation, and evaluation of narrative-based curriculum materials. The data consisted of questionnaires, classroom observations, and interviews with the students and teachers. The analysis of the data showed that most of the students developed adequate scientific understandings about natural selection and they perceived the narrative as easier to comprehend than the textbook. The findings speak to the need for examining ways of blending narrative effectively into science lessons.

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Narrative; fiction; science education

Introduction and theoretical underpinnings

Research shows that young people (10–17) have negative attitudes toward science and no interest toward engaging with science (European Commission, 2015). In a review study, Osborne, Simon, and Collins (2003) concluded that students' interest and attitudes to science declines when entering secondary school. What's more interesting in the findings of this study is that students' attitudes toward science in general are positive, but toward school science are not. Here lies an important task for school education to tackle this problem, given the importance of engaging young people with science and supporting their development of scientific literacy. The European Commission with the recently launched program Horizon 2020, the largest EU Research and Innovation program, has made it one of their goals to make science and scientific careers attractive for young people.

A review of the literature shows that one approach to addressing the problem of young people's disengagement with science is by exploring alternative

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and attractive modes of communicating science, such as the use of *narrative* (Avraamidou & Osborne, 2009). Bruner (1986) differentiated between two distinct ways that humans order experience. He called the first one paradigmatic, which refers to organizing thought that is logico-scientific, based on reasons. The second way that humans order experience according to Bruner, is narrative and deals with the creation of stories. As he described, narrative is used to refer to a way of sculpting and structuring information through expressions of different media into readily understood forms that guide learners' comprehension; and to a cognitive mode that learners use to make sense out of information or experience. Narrative then becomes part of how people understand the world they live in and they serve as a way of communicating that understanding to others. Chatman (1978) in Story and Discourse defined narrative and described the ways in which it can be actualized:

> Narrative is basically a kind of text organization, and that organization, that schema, needs to be actualized: in written words, as in stories and novels; in spoken words combined with the movement of actors imitating characters against sets which imitate places, as in plays and films; in drawings; in comic strips; in dance movements, as is narrative ballet and in mime; and even in music. (Chatman, 1978, pp. 117–118)

The research study presented in this paper is concerned with narratives realization in text, as in stories. For a story to be effective, as illustrated in a meta-analysis study (Avraamidou & Osborne, 2009), it needs to have seven components as illustrated in Table 1. Each of these components plays a special part in the narrative. The narrative has a purpose, to help us understand the world and help the reader to invent new entities and concepts of the narrated world. It is also characterized by having a chain or sequence of events that are connected to each other and arranged into an identifiable structure, such as beginning, middle, and end, where events are related temporally. By doing this, narratives also establish a sense of time that integrate past and future. The agents (human and nonhuman ones) cause and experience events and give a sense of agency that moves the story forward.

Avraamidou and Osborne (2009) also emphasized the narrator and the reader as important components of narrative. These can be more or less directly included in the narrative. The narrator can be either a real character or, alternatively, a sense of a narrator. The reader can be directed in the text or must at least interpret the text as narrative. Avraamidou and Osborne (2009) argued that these important

Table 1. Table adopted from Avraamidou and Osborne (2009) with the seven necessary components from narratives based on their meta-analysis.

Narrative component	Description of component
Purpose	To help us understand the natural and human world. In the case of the natural world, narratives help the reader to invent new entities, concepts, and some picture of the scientist's vision of the material world
Events	A chain or sequence of events that are connected to each other
Structure	An identifiable structure (beginning, middle, end) where events are related temporally
Time	Narratives concern the past
Agency	Actors or entities cause and experience events. Actors may either be human or material entities who act on each other
Narrator	The teller who is either a real character or alternatively, a sense of a narrator
Reader	The reader must interpret or recognize the text as a narrative

features of narratives are normally not accentuated in traditional expository texts in science education, such as causality, intentionality, and temporality. The purpose of the study reported in this paper was to explore the impact that these unique features of narrative have on students' science learning about natural selection. Essentially, narrative was used as a learning tool.

The term "learning tool" describes any device or technique that focuses on students' analytical processes, provides support, and gives directions for the practices of the learner – essentially, it mediates students' understandings of the world (Murmann & Avraamidou, 2014). The understanding of narrative as a cognitive tool for learning is based on the assumption that student already know the narrative structure and content and consistently use them in an attempt to understand and retell their experience. Narrative is a familiar tool given its use for communication in everyday life, and which students can use for interpretation. Hence, by introducing narrative to school science, students have a familiar structure to help them cope with all the unfamiliar elements that comes with learning a new topic, developing skills, and physically navigating in learning environments. Based on this premise and grounded within theoretical foundations about the value of narrative in communicating science, the purpose of this study was to *examine the impact of a narrative-based lesson on two groups of high-school students' understandings of natural selection*.

Literature review and purpose

A review of the literature illustrates that only few researchers have examined the impact of narratives on students' science learning through empirical studies. In a study with primary school students, reading narratives resulted in a higher understanding of evolution than the expository text (Browning & Hohenstein, 2015). 16 year one, 21 year two, and 25 year three students of a British primary school were divided in two groups. One group read a narrative story about evolution, the other read an expository story. The stories were about how the first humans arrived on Earth. A questionnaire was used to test the presence of pre-existing knowledge about evolution. After the reading assignment, the students participated in semi-structured interviews. The results showed that there was no difference in believing the book's information between the two texts. The students reading the narrative text showed a greater understanding about the evolution theory than those reading the expository text. This may be an effect of age, as the year three students scored better in the narrative text compared to the other years. Prior knowledge did not affect the results, but students without prior knowledge did better on the narrative text than on the expository text. These results suggest that narrative structures may lift some of the children's conceptual constraints.

Similarly, Negrete and Lartigue (2010) have conducted a study to examine how efficient narrative texts were compared to factual text in communicating science, with a group of university students. They investigated how these two text forms

differed in understanding and retaining the information. The study was tested on 40 Sociology students of Bath University in the United Kingdom. Using the RIRC (Retelling, Identifying, Recalling, Contextualizing) method, the questionnaire provides an evaluation of an individuals' capability of retaining and understanding information. The research consisted of two sessions. Two different narratives and expository texts were used: one text about natural selection and another about nitrogen. The students would read the text and afterward answer the questionnaire. In the second session, a week later, they had to fill in the same questionnaire. In comparing these sessions, the researchers found that in the first session, the factual group scored higher on all tasks than the narrative group. However, in the second session, there was no difference between these two groups. Also, there no difference was found between sessions of the narrative group. These results provide evidence that in contrast to the expository text, when reading a narrative the information is longer retained, suggesting a different effect on the long-term memory.

Building on this literature, the aim of our study was to *examine the impact of a narrative-based lesson on two groups of high-school students' understandings of natural selection*. The topic was chosen given literature pointing to the fact that young students have misconceptions about natural selection and the alternative concepts are almost the same across different culture, ethnic groups, and class backgrounds (Gregory, 2009). In response to this problem, the aim of this study was to examine the impact of a narrative-based lesson on students' understandings about natural selection. The research questions that guided the study are:

(1) What is the effect of a narrative-based lesson on two groups of high school students' scientific understanding about natural selection?
(2) How did students perceive their engagement in the narrative-based lesson?

Methods

Research approach and limitations

The study utilizes a mixed-method, case study approach. It focuses on the design and testing of an intervention (i.e., narrative-based curriculum materials) and aims at contributing to theories of learning and teaching (Merriam, 2009). The study used a quasi-experimental design. As such, there was no control group, but only one group of students who participated in the intervention. The case study is defined by two groups of high school students (group A: 16–17 years old and group B: 15–16 years old) with very little background knowledge about natural selection. For the purpose of the study, the researchers developed the curriculum materials, based on the narrative framework (Table 1) while consulting with the two teachers in order to make sure that the language and content were appropriate for the students' age-level. The researchers also informed the teachers about

the purpose of the studies and they all agreed about how to enact the lessons, in order to maintain consistency between the two classes.

As in other case studies, the findings of this study are limited and cannot be directly generalized beyond the context of the study (Corbin & Strauss, 2008). The purpose, however, was not to form generalizations but to illustrate the characteristics of this unique case (i.e. implementation of a narrative-based text in a school science lesson about nature selection) and examine its impact on students' understandings about natural selection as well as how the students perceived their engagement in the lesson. Transferability of the findings is feasible, nevertheless, as they might be applicable in similar contexts and settings.

Context and materials

The study took place in an urban public school in the Netherlands. Two classes of students (middle-class, mostly Caucasian) aged 15–17, participated in this research. The students in Class A (15 students) were a year older than the students in Class B (11 students). Class A consisted of 13 girls and two boys, and group B consisted of eight girls and three boys.

For the purpose of data collection, the two groups completed two different sessions. During the first session the students read the narrative text, and afterward they had to fill in a questionnaire, which was used and validated in Negrete and Lartigue's (2010) study. Following that, the students participated in a classroom discussion moderated by their teacher. A week later, the second session took place. Students had to complete the same questionnaire again. The questionnaire consisted of different kinds of questions, testing different memory tasks such as recalling, recognizing, and retelling knowledge. This is called the RIRC-method and refers to: Retelling, Identifying, Recalling, Contextualized, which provides an evaluation of an individual's capability of retaining and understanding information (Negrete & Lartigue, 2010). The aim of this method as described by the researchers, is to assess the amount of scientific information remembered and learnt by individuals who have been exposed to scientific information in narrative format, in comparison to other texts containing the same scientific factual information (e.g. paradigmatic). The method uses different memory tasks in order to evaluate an individual's capability to retain scientific information, and which involve implicit and explicit memory.

During the intervention the first author participated as a silent observer and collected qualitative data about the nature of students' engagement and the nature of the classroom discourse. With the teachers' and students' consent, there was also an audio-recorder to record the classroom discourse. Upon completion of the lessons, the first author conducted individual interviews with the teachers in order to collect data regarding their views about students' engagement in the activities and the classroom discourse. In addition, the first author conducted semi-structured interviews with students of different abilities, who served as focus

groups. The data from these interviews served for triangulation purposes for the post-tests data, which contributes to the validity of the findings.

The narrative and questionnaire used in this study were adopted from Negrete and Lartigue (2010). In their study they used a text adapted from Anatoly Dneprov's "Crabs take over the Island." This story was translated in Dutch and condensed by the authors from 10,000 words to around 1500 words and it exemplifies the seven components of narrative (Table 1) text as proposed in a review study (Avraamidou & Osborne, 2009).

The story describes the processes of natural selection. The story describes how a researcher called Cookling brings a certain robotic crab to an island to test the evolution theory of Darwin. This crab eats metal in order to replicate itself. Each copy of the crab varies a little bit from its predecessor, portraying the process of natural variation. One day, all the metal is devoured from the island. In order to survive, all the crabs have to fight to be able to eat the robotic crabs. This fight implies the "survival of the fittest," whereas the crab that is the most adapted to the environment will survive. Thus, the story ends with one giant crab being the only survivor, alas the "fittest" one on the island.

Data collected

The research data for this study consisted of classroom observations, two questionnaires and interviews with the students and the teachers (see Table 2). It's important to note that there are no data from the second session of group B because only four out of 11 students filled in the questionnaire. Hence, given the low sample size, these data were not used.

The purpose of the classroom observation was to document the nature of students' engagement (high–low) and participation in the classroom discourse (level of participation). The questionnaire was used to evaluate students' conceptual understandings about natural selection. The interviews with the students and teachers served different purposes. The interviews with the students aimed at collecting information about students' conceptual understandings as well as how they perceived the narrative text. The students were selected in such a way to obtain a representative group in terms of their abilities (high achievers and low achievers), for which information was provided by their teachers. The purpose of the interviews with the teachers was to evaluate their perceptions of the narrative-based lesson and their students' engagement in the classroom activities.

Table 2. Data collected.

Data collected	Group A: 16–17 years old	Group B: 15–16 years old
Questionnaires	15(s1); 14 (s2)	11(s1); 4(s2)
Classroom observation	50 min	50 min
Individual interviews	3	3
Interviews with teachers	Teacher F: 30 min	Teacher P: via e-mail

Note: S1 refers to session 1 and S2 refers to session 2.

Data analysis

In order to examine the extent to which students understood and engaged in this lesson, the group discussion was recorded and analyzed. In addition, a few purposefully selected students as well as the teachers were interviewed. During the narrative-based lesson, the first author sat in the back of the class and observed the lesson and also took notes of how the lesson unfolded. Simultaneously, an audio-recorder recorded the classroom discourse. The interviews with the students and one teacher were audio-recorded as well for the purpose of responding to the second research question regarding how students perceived the narrative text as well as their engagement in the lesson. The audio-recorded interviews and discussions were transcribed and analyzed using open-coding techniques, and looking for patterns and themes in the data by all authors. (Merriam, 2009). In doing so, we looked at basic concepts that recurred and color-coded these parts of the data that described similar concepts. Comparing the interviews with the class discussion and the questionnaires, the data analysis was validated through triangulation and cross-verification.

Findings

Figure 1 presents the performance of group A of the questionnaire between the first and the second session. The statistical test used for this comparison is the paired *t*-test, a test which is used to compare the means of one group at two different times. There was a significant difference between the first ($N = 15$) and second session regarding the retelling question ($t(26) = 3.77$, $p < .001$). For the other categories of the RIRC-method, there was no significant difference. Figure 1(b) presents the performance of both groups on the questionnaire in their first session. The statistical test used for this comparison is the t-test, a test to compare

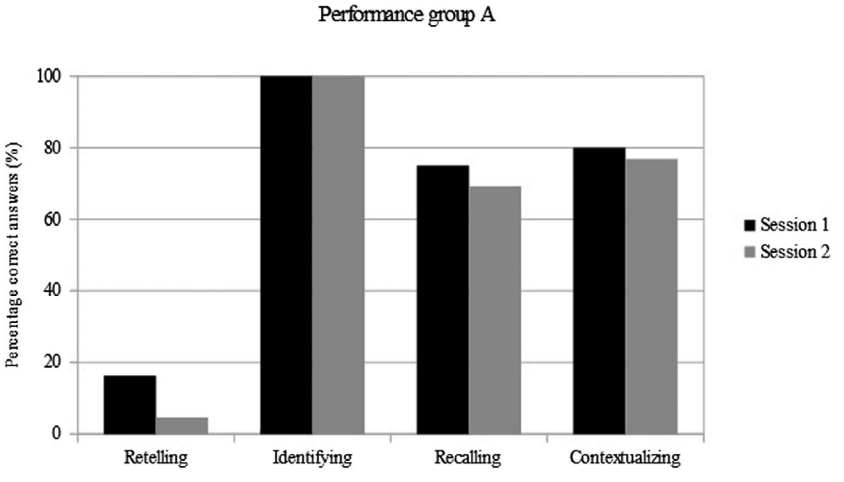

Figure 1. Performance of group A compared between sessions.

the means of two groups. There was a significant difference between the classes' responses regarding the retelling question ($t(10) = 3{,}19$, $p < .01$). For the other categories of the RIRC-method, there was no significant difference.

In Figure 1 the performance (percentage of correct answers) of the students in group A is illustrated for the first and second session. The graph shows that overall scores in the first session are higher than the second session, but only in the retelling category this difference is significant. Figure 2 shows a similar graph, depicting the performance of both groups' first session. It shows that in retelling, group A performed significantly better, but differences in the other questionnaire categories were not significant.

Figure 2 shows a similar graph, depicting the performance of both groups' first session. It shows that in retelling, group A performed significantly better, but differences in the other questionnaire categories were not significant.

Each category stands for one or a few questions of the questionnaire. The Retelling category consists of the first open-ended question in the questionnaire. Students had to retell the story in their own words. Their answers were compared to the facts that the story consisted of. For each fact the student mentioned correctly, the student got one point. The results show that in the second session, students used less factual information to retell the story.

For Identifying, the students had to choose the correct multiple choice answer. These were the second and third question of the questionnaire, and every student had these questions right. This result did not differ between sessions and groups.

Questions four, five, six, and seven were recalling questions. The students answered two to three of these questions right. They could get half a point if they got one of the elements that are needed to convert sunlight into electricity right. Although there is no significant difference between sessions ($p > .01$), there seems to be a slight decrease in the scores of group A.

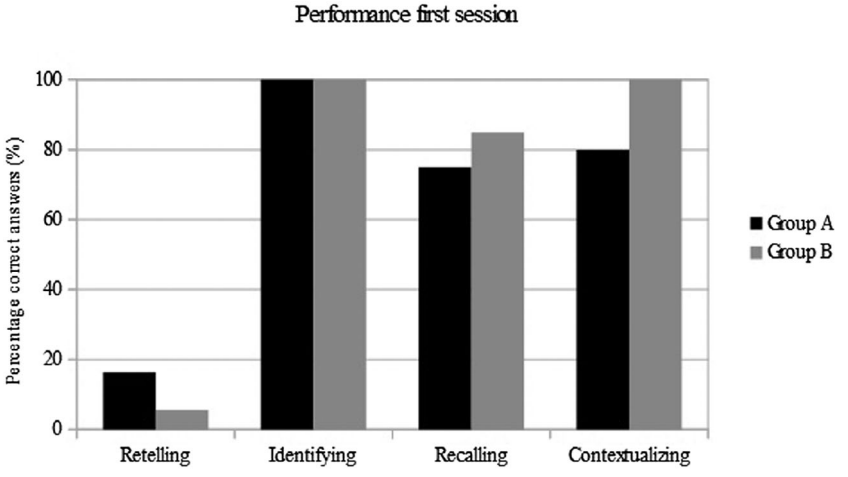

Figure 2. Performance between both of the groups' first session.

The contextualizing question was the last open-ended question. Students had to define a resolution to a situation. In this case, they had to come up with a small research for which they could use the facts in the story. Although most students did not elaborate on their ideas, and mostly explained their resolution in one or two sentences, the authors could understand their reasoning and evaluate it. Twelve out of 15 students of group A and all students of group B provided a correct answer.

Moreover, the analysis of the interviews and classroom discussions resulted in characterizing students' engagement and perceptions of the narrative-based lesson. These are presented below in a series of main assertions as those became evident in the analysis of the data: (a) most students thought the narrative was enjoyable and exciting, (b) some students found the narrative better than the textbook, (c) some students found the textbook better than the narrative, (d) some students were confused about the fictional elements in the story, and (e) the teachers were enthusiastic about the use of narrative and thought the students engaged with high motivation.

Students' enjoyed the narrative

When asked what they thought about the narrative used in the lesson, the students stated that they enjoyed the text. Examples that provide evidence for this assumption are the following quotes:

> [...] I also liked that they put difficult [scientific information] in such an easy story. That makes it more fun to read.
>
> I thought it was an enjoyable text. [...] Also original and funny.
>
> I liked it. And it was exciting [to read].
>
> I thought it was a funny but also an informative text.
>
> I liked to look at it [the information] in a different way. And I thought it was quite nice to recognize what I've learned in a different situation.
>
> I thought it [the narrative] was pretty interesting and I thought it was nicer to read than the texts we have in the book. [...] The texts in the book have a lot of concepts that I don't understand yet or don't know. And in such a narrative it is much easier and more simple, and I think it is easier to remember.
>
> I thought it was a nice text. Yes. I think that it works well. [After asking why]: Well, I still know very well what the story was about and what the image in my head was. And with normal textbooks I don't have an image and would probably not remember it that well.
>
> With this text I can put less effort in trying to understand what it says, whereby I understand what it says more easily. I would understand "survival of the fittest" better than a text that is harder for me to remember, for example one from the textbook. So I like this better.

This observation is cross-verified with the opinion from the teachers as it became evident in the analysis of their interviews. From the interviews with the

teachers about the narrative implemented in the lesson they told me that they thought their students were positive about it. Both teachers agreed on the fact that the students enjoyed the narrative used in the class. Teacher B said that he thought the narrative and the context used in it were nice. Also, he thought the students enjoyed reading it. From group B, seven of the 11 students stated that they prefer the narrative over the school book text.

> Overwhelmingly, the students indicated that they really liked it [the narrative]. That they thought it was a bizarre way to think about the theory in a different way than they did before. And they enjoyed that. – Teacher from group A

This statement is reflected in the analysis of the classroom observations as well. As evidence in the analysis of the classroom discourse, students were concentrated when reading the narrative in both groups, listening carefully and participating in the classroom discussion with enthusiasm

Narrative versus textbook

When asked to share their preference regarding the narrative or the usual textbook, students had different views. Some students would choose the narrative, arguing that:

> It is more enjoyable to read than a school book.
>
> I still remember very well what the story was about and my image of it in my mind.
>
> With normal school texts I don't visualize it and probably wouldn't remember it as well.

In the interviews, students said that the narrative was easy to remember because they can form an image in their head. Comparing it with the school texts, one student said that schoolbooks could be a bit boring, and with the narrative they were really interested in how the story would end. Another student stated that that they made up a story to remember the information from the textbook.

Student:	I mostly make up things to make it [the information] easier to remember.
Researcher:	So you make up a story for yourself?
Student:	Something like that yes.
Researcher:	That is funny.
Student:	That you can imagine it for yourself. That you think about: where do I encounter things like that, and that you try to make it more personal, so that is something I usually do when I read something like that so it helps.
Researcher:	Do you have an example of something like that?
Student:	Well, I don't really know. We talked about the circulatory system, so I will look at it from the perspective of the blood cell, that you come across everything [in this system] and think about what you would do there if you were a blood cell. In a different way to remember it. So those kinds of things, I imagine to make it easier to remember things.

In contrast, some students preferred the school texts, as they said:

> I think that the book is better [because] it is much more clear.

> but to really replace this [textbook] with the narrative is kind of difficult, because then it is not concrete what the theory is, but it is set in a situation. It [the narrative] is something that can help you remember, but not something to really learn something from.

> Uhm, I think the textbook, because some things in the story were made up and that is not real. Sometimes it is hard for me to separate [fact from fiction]. And then.. [pause], if there were less made up things in then I would have chosen the narrative, because it is much more fun to read than a textbook. That is just… much more fun.

A few students expressed that they saw the benefits of both texts and preferred a combination of using both. When asked if they prefer the narrative or the textbook, students said:

> A combination [of textbook and narrative] I think. I am not only going to read stories of course. You need to have a book with facts and the story, otherwise you don't know what is a fact and what is not.

> I think that if you really want to learn something, that it is better to use a book. But to really understand it something like that [a narrative] is useful. I don't think you can understand it [the information] with a narrative only.

> If you really want to learn something, that it is better to use the book. But to understand it something like that [the narrative] is useful. I don't think you can understand it by only using the story. You can start with something like that. That you understand it and then later you remember the crab story, and then you know "survival of the fittest", that you have that connection and in this way you can remember things more easily.

> I think that if you learn from the textbook that you get the information quicker, but that it is useful to have a story, because then you have a more clear example.

Separating scientific facts from fiction

Moreover, as evident in the analysis of the data, there was some confusion among the students regarding the fictional elements in the narrative. A few students found it difficult to separate the facts from fiction. After asking what the impact would be if they did not know all the facts in the story, some students said:

> For me it was clear because I knew it [the facts], but if you did not know them it can be hard to recognize the facts in the story.

> I think that it would be more difficult to know what the theory is or not. [I think] you would read over it faster.

> I am not sure that when I wouldn't have had it [the information] that I would understand. If I never knew about the theory, that I wouldn't understand everything.

The following excerpt from an interview illustrates how a student explains how the confusion may take place:

Researcher: The idea of the narrative was that the setting of the story was fictional, but that there were real scientific facts in it. That about the [silicium in the] sand was also real. But you thought that it was not [real]?

Student: I really did not know that. Now that I think about it it is quite funny that that was true. I thought, well, maybe they made that up or something.

Researcher: So it sounds a bit as if you did not know the facts and you would read a text that is not truly realistic, that you may think that the information in it is not a real fact.

Student: Right, because that was what I thought. I thought that it wasn't true. I thought that perhaps they made that up as well, because it makes sense that there is sand on the island so maybe it was convenient for the story or so I did not know that that mineral was really in the sand.

Researcher: Maybe that is a little disadvantage about such a story, that you may doubt that the things in it are true or not?

Student: Yes, but that is something I do anyway. When you read a story that is as unrealistic as robot crabs are, then you tend to think that a lot of things are unrealistic. I think I might have had that with the thing about the sand.

The teacher from group B said that a weak spot of a narrative is "that 'untrue' information may be accepted as true. That is the base for misconceptions that often need to be repared with a lot of effort. The narratives need to be good." Overall, both students and teachers concluded that it is important that readers from a narrative know what is a true fact and what is fiction.

Conclusions and recommendations

The results of the questionnaire suggest that the narrative was well remembered and understood by most of the students. In both groups and both sessions the percentage of correct answers was high, except for the Retelling category. The Recognition, Identifying, and Categorization categories did not differ significantly between the first and second session of group A, and the first session of group A and B. This shows that the memory and understanding of group A was the same after a week.

The 100% score for the identifying category is *Telling*, as this was the highest scoring category of the crabs story in the study of Negrete and Lartigue (2010) as well. This reflects Sternberg's (2003) observation that recognition memory is usually better than recalling. Another result that stood out was the score in the retelling category. There was a significant difference between the sessions of group A and the first session of group A and B. In Negrete and Lartigue's (2012) study, the retelling category was the lowest as well. A possible explanation is that the students lacked the scientific vocabulary (Lemke, 1990) needed to describe facts when retelling a story, which however, does not mean that they lacked conceptual

understandings. This could explain why their scores are low. As apparent in the findings, the students did well on the other categories, so it seems that the students did know the scientific information and understood it well enough.

Based on the analysis interviews and classroom discussions we asserted that students enjoyed the narrative during the school lesson. As evident in the results, students found the narrative interesting, easy to remember, and fun to read. This is in agreement with existing related literature. For example, in their study, Frisch and Saunders (2008) showed that the use of stories in a Biology lecture made students more comfortable, willing to learn and made the lecture more enjoyable to them.

Research findings have provided evidence that narrative structures are useful for learning science. Researchers argued that narratives could humanize science education by taking into account the human elements of science and consequently help create a more detailed index than abstract knowledge, usually presented in science education. As Norris, Guilbert, Smith, Hakimelahi, and Phillips (2005) argued, students find it easier to memorize the familiar cognitive schemas of narrative content and form than to memorize traditional discourse genres, such as expository and argumentative texts, where the structure is often unknown. The close correspondence to everyday experience of situations and episodes also make narratives a very natural mechanism of comprehension. Additionally, students benefit from stories in their learning environment because stories provide an opportunity for reflection, evaluation, illustration, exemplification, and inquiry (Conle, 2003) and enhance interest, memory, and understanding.

Concluding, the findings of this study revealed the following:

- Most students developed adequate scientific understandings about natural selection
- Most students thought that the narrative was enjoyable and exciting
- Most students found that the narrative text is better than the text-book
- Most students found that the textbook is better because they are used to it, and it's more structured
- A few students were confused about the possibility of existence of fictional elements in the story
- Both teachers were enthusiastic about the use of narrative and thought that the students engaged with high motivation

Summing up, in this study we explored the idea of using a narrative as a learning tool in the context of a school setting. As such the findings of this study offer a significant contribution to the existing limited literature about the use of narratives in school science. As the findings of this study showed, using narratives in communicating scientific information is valuable and should be further examined to investigate its potential for science teaching and learning. Grounded within the findings of the study, the following set of recommendations for future research are offered:

- Conduct research with a larger sample size and for a lengthier period to produce generalizable results.
- Use a comparison group with a different text form to find out what the effect of a narrative text truly is.
- Use topics that the subjects have no or as little as possible background knowledge of as this will ensure that they will learn from the narratives.
- Blend narrative into a lesson instead of using it as a stand-alone tool.

Disclosure statement

No potential conflict of interest was reported by the authors.

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